

WHAT IS CLAIMED IS:

1. An exposure apparatus that exposes a pattern of a mask onto an object by a projection system, comprising:
  - a frame that has a support member to support the projection system and a suspended member that is suspended from the support member;
  - a first base that is coupled to the support member, the first base having a first horizontal plane;
  - a second base that is coupled to the suspended member such that the suspended member receives the weight of the second base, the second base having a second horizontal plane that is located below the first horizontal plane;
  - a mask stage that is movably supported by the first horizontal plane to retain the mask, the mask stage having a first reflective member;
  - an object stage that is movably supported by the second horizontal plane to retain the object, the object stage having a second reflective member;
  - a first linear motor that has a first member coupled to the mask stage and a second member to move the mask stage parallel to the first horizontal plane;
  - a second linear motor that moves the object stage parallel to the second horizontal plane;
  - a first interferometer system that cooperates with the first reflective member to detect a position of the mask stage, the first interferometer system being supported by the frame;
  - a second interferometer system that cooperates with the second reflective member to detect a position of the object stage, the second interferometer system being supported by the frame; and
  - a reaction frame that is dynamically isolated from the frame to receive a reaction force caused by a movement of the mask stage, the reaction frame having a member that is located above the suspended member and coupled to the second member of the first linear motor.
2. The exposure apparatus of claim 1, wherein the first linear motor moves the mask stage in a first direction parallel to the first horizontal plane.
3. The exposure apparatus of claim 2, further comprising a third linear motor having a coil and a magnet to move the mask stage in a second direction different from the first direction, one of the coil and the magnet being coupled to the reaction frame.

4. The exposure apparatus of claim 3, wherein the first interferometer system detects the position of the mask stage with regard to the first direction.
5. The exposure apparatus of claim 4, further comprising a third interferometer system that detects the position of the mask stage with regard to the second direction.
6. The exposure apparatus of claim 5, wherein the first interferometer system is supported by the support member of the frame.
7. The exposure apparatus of claim 6, wherein the second interferometer system is supported by the support member of the frame.
8. The exposure apparatus of claim 7, wherein the third interferometer system is supported by the support member of the frame.
9. The exposure apparatus of claim 8, wherein the second member of the first linear motor is movable along a guide that is coupled to the reaction frame.
10. The exposure apparatus of claim 9, wherein the reaction frame receives a reaction force caused by a movement of the object stage.
11. The exposure apparatus of claim 1, wherein the first interferometer system is supported by the support member of the frame.
12. The exposure apparatus of claim 1, wherein the second interferometer system is supported by the support member of the frame.
13. The exposure apparatus of claim 1, wherein the second member of the first linear motor is movable along a guide that is coupled to the reaction frame.
14. An exposure apparatus that exposes a pattern of a mask onto an object by a projection system, comprising:
  - supporting means having a support member for supporting the projection system and a suspended member that is suspended from the support member;
  - first guiding means having a first horizontal plane;
  - second guiding means having a second horizontal plane;
  - mask holding means for retaining the mask, the mask holding means being movably supported by the first horizontal plane and having a first reflective member;
  - object holding means for retaining the object, the object holding means being movably supported by the second horizontal plane and having a second reflective member;
  - first moving means for moving the mask holding means parallel to the first horizontal plane, the first moving means having a first member coupled to the mask holding means and a second member;

second moving means for moving the object holding means parallel to the second horizontal plane;

first position detecting means for detecting a position of the mask holding means and cooperating with the first reflective member;

second position detecting means for detecting a position of the object holding means and cooperating with the second reflective member; and

reaction-force-receiving means for receiving a reaction force caused by a movement of the mask holding means, the reaction-force-receiving means being dynamically isolated from the supporting means and having a member that is located above the suspended member and coupled to the second member of the first moving means.

15. An exposure method that exposes a pattern of a mask onto an object by a projection system, comprising the steps of:

providing a frame that has a support member to support the projection system and a suspended member that is suspended from the support member;

providing a first base that is coupled to the support member, the first base having a first horizontal plane;

providing a second base that is coupled to the suspended member such that the suspended member receives the weight of the second base, the second base having a second horizontal plane that is located below the first horizontal plane;

moving a mask stage having a first reflective member by a first linear motor, the mask stage being movably supported by the first horizontal plane to retain the mask and the first linear motor having a first member coupled to the mask stage and a second member;

moving an object stage having a second reflective member by a second linear motor, the object stage being movably supported by the second horizontal plane to retain the object;

detecting a position of the mask stage by a first interferometer system that cooperates with the first reflective member, the first interferometer system being supported by the frame;

detecting a position of the object stage by a second interferometer system that cooperates with the second reflective member, the second interferometer system being supported by the frame; and

receiving in a reaction frame, a reaction force caused by a movement of the mask stage, the reaction frame is dynamically isolated from the frame, the reaction frame

having a member that is located above the suspended member and coupled to the second member of the first linear motor.

16. The method of claim 15, wherein the first linear motor moves the mask stage in a first direction parallel to the first horizontal plane.

17. The method of claim 16, further comprising moving the mask stage in a second direction different from the first direction by a third linear motor having a coil and a magnet, one of the coil and the magnet being coupled to the reaction frame.

18. The method of claim 17, wherein the first interferometer system detects the position of the mask stage with regard to the first direction.

19. The method of claim 18, further comprising detecting the position of the mask stage with regard to the second direction by a third interferometer system.

20. The method of claim 19, wherein the first interferometer system is supported by the support member of the frame.

21. The method of claim 20, wherein the second interferometer system is supported by the support member of the frame.

22. The method of claim 21, wherein the third interferometer system is supported by the support member of the frame.

23. The method of claim 22, further comprising moving the second member of the first linear motor along a guide that is coupled to the reaction frame.

24. The method of claim 23, further comprising the reaction frame receiving a reaction force caused by a movement of the object stage.

25. The method of claim 15, wherein the first interferometer system is supported by the support member of the frame.

26. The method of claim 15, wherein the second interferometer system is supported by the support member of the frame.

27. The method of claim 15, further comprising moving the second member of the first linear motor along a guide that is coupled to the reaction frame.